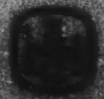
Ministry of Environment Annual Report

for the period April 1, 1993 to March 31, 1994



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Ministry of Environment
Annual Report
1983/84

Ministry of Environment Annual Report 1983/84

Province of
British Columbia
Ministry of
Environment

Honourable Anthony Brummet
Minister
B.E. Marr
Deputy Minister

VICTORIA, BRITISH COLUMBIA
Activities of all programs are covered for the period
April 1, 1983 to March 31, 1984.

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To His Honour the
Lieutenant-Governor of
the Province of British Columbia

MAY IT PLEASE YOUR HONOUR

Herewith I beg respectfully to submit the Annual Report of the British Columbia Ministry of Environment for the period April 1, 1983 to March 31, 1984.

Anthony J. Brummet
Minister of Environment

The Honourable Anthony J. Brummet
Minister of Environment

SIR:

I have the honour to submit the Annual Report of the British Columbia Ministry of Environment for the period ended March 31, 1984.

B.E. Marr
Deputy Minister

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Ministry of Environment

Deputy Minister's Summary

This report documents the work of the Ministry of Environment, carried out through a wide range of program activities.

During 1983/84, the ministry continued as an organization committed to ensuring a quality environment for British Columbians. In exercising that mandate, and in its dealings with other agencies of government, industry and the public, the ministry addressed a broad spectrum of concerns ranging from resource stewardship to environmental protection, human health and safety.

By the beginning of this reporting period, the structure and legislative framework required by this mandate were effectively in place. The nature of the ministry's programs and functions requires a regionalized structure assisted by a centralized core of tightly integrated programs and support services. This structure ensures that practical decision-making can be carried out in response to changing conditions and developments and that direction and control are exercised under clearly articulated policies, priorities and objectives.

The year began and ended with important announcements in the area of water management. At the beginning of the year, 16 major flood prevention projects were announced in various locations across the province. Besides providing improved protection for flood-prone communities, several of these projects promise significant benefits for agriculture, fisheries enhancement and job creation.

The Skagit Valley flooding issue was successfully resolved on March 30, 1984 with the signing of an agreement by the Minister of Environment and the Mayor of Seattle. The agreement satisfied the concerns of the various parties involved, and followed several years of negotiation with the City of Seattle and the International Joint Commission.

The waste management program continued its effort to ensure higher levels of permit compliance. With the cooperation of the municipalities and regions involved, substantial progress was made in the development of waste management plans for the Lower Mainland and the City of Vernon.

Progress toward a province-wide management system for special wastes made significant strides with the endorsement in September 1983 of an industry-operated system and the identification of potential secure landfill sites. Details of the regulations for the handling of special wastes under the Waste Management Act were announced in February 1984.

Wildlife and fisheries program activities reflected the increasing public demand for recreation opportunities based on these resources, with $9.94 million gererated during 1983/84 from the sale of 848,265 hunting and angling licences. An additional $489,744 was realized from the sale of commercial licences and $104,943 from fur royalties. Expenditures under the two programs totalled $18 million, including $1.6 million as the provincial share of the federal/ provincial Salmonid Enhancement Program.

Planning activities by the ministry during the year included the completion of strategic plans for the Peace and Finlay-Omineca sub-regions and preparation of ministry submissions relating to a number of inter-agency plans, including 27 Regional District Official Settlement Plans, three Crown land and foreshore planning initiatives of the Ministry of Lands, Parks and Housing, the five-year Forest and Range Analysis of the Ministry of Forests and the Northwest Development Study being coordinated by the Ministry of Industry and Small Business Development.

The ministry was actively involved in impact assessment on several major project proposals, particularly the Quinsam Coal and Sage Creek Coal Projects, the Port Simpson liquid natural gas plant, the Vancouver Island natural gas pipeline, Alcan's Kemano completion project and associated smelter at Vanderhoof, the Murphy Creek-Keenleyside hydro power project proposed by B.C. Hydro, and the resumption of offshore oil and gas exploration.

The development and implementation of environmental management plans for the Fraser, Cowichan and Squamish estuaries continued as a priority concern involving all levels of government as well as the industries affected. The ministry was a major contributor to this process.

Expansion in the mariculture industry, particularly in shellfish culture and salmon farming, placed a growing demand on the technical services of the ministry's marine resources program, in addition to its regulatory functions in the fish processing and buying sectors.

The air management program continued monitoring air quality across the province and provided valuable data on airborne pollutants both to the ministry and other agencies. Particular attention was given to the problem of acid rain: six permanent provincial monitoring stations were installed during the year to complement the federal government's eight stations.

The ministry is also responsible for ensuring the safe use of federally-registered pesticides through the pesticide control program. During 1983/84, the regulations to the Pesticide Control Act were amended to allow farmers to spray leased Crown land under permit-like conditions.

The Provincial Emergency Program continued its work of coordinating emergency arrangements for the province. In particular, severe flooding in the southwest part of the province during early January 1984 required the immediate provision of temporary assistance and an $8 million Order-in-Council for flood relief.

The ministry also provides mapping and related data services to both government and non-government clients through the surveys and mapping program. During the year this program filled over 35,000 service requests, and provided essential information both for programs of the ministry and those of other resource agencies.

The Conservation Officer Service ably and efficiently discharged its responsibility for enforcing a wide range of ministry legislation, despite a significant increase in violations over the previous year. Greater emphasis is being placed on enlisting the support of the public in preventing and reporting violations.

The ministry's general administration program continued its support of other ministry operations through a variety of services.

A number of information activities were wound down during the year following the government's decision to centralize information services. Delivery of the Conservation and Outdoor Recreation Education Program (CORE) was transferred to the Open Learning Institute and the B.C. Federation of Shooting Sports, and the ministry magazine Wildlife Review was sold to a private publisher. Over 80 news releases were issued, and a major communication program was mounted for the special waste management program.

Financial services of the ministry were made more efficient by the introduction during the year of an electronic budgetary accounting system to give up-to-date information on expenditures and funds available. In addition to this, the ministry's computing services continued to meet the growing needs of all programs for computing, word processing and system services. Ministry revenues and recoveries for 1983/84 totalled

$192,124,658, and expenditures totalled $80,981,257.

The personnel office played a significant part in managing the downsizing operations which reduced the ministry's employment level by 30 per cent. Due to restraint, few staff were recruited during the year. Staff development and safety training functions received strong emphasis because of the need for enhanced productivity with fewer resources.

The administration's central services unit met a variety of accommodation needs for the ministry as well as providing a wide range of other services. A highlight of the year was the completion of five Regional Interim Waste Storage Facilities at Victoria, Nanaimo, Kamloops, Penticton and Surrey.

Managers continued to be fully involved in the development of budget and control of expenditures in 1983/84. Throughout this involvement, the ministry is able to clearly set priorities and establish procedures to ensure that funds are used in the most effective way.

Programs

Fisheries Management

Wildlife Management

Marine Resources

Water Management

Air Management

Waste Management

Pesticide Control

Provincial Emergency

Surveys and Resource Mapping

Environmental Appeal Board

Fisheries Management Program

The goal of this program is to manage fisheries resources so that present and future generations can reap the maximum economic, recreational, cultural, and scientific benefits. This will be done by:

- Protecting or enhancing essential natural habitat and the species that occupy it.
- Controlling the harvest of sport fish (currently about 8 million fish per year are caught by 500,000 anglers, comprising 5M. angler days) to preserve the stocks at a safe level for adequate reproduction.
- Participating in the federal/provincial S.E.P. program and by working and co-operating with other agencies to protect fish habitat.
- Stocking lakes and improving streams to provide a range of recreational opportunities across British Columbia.

Legislation Administered

Fisheries Act (Canada) and Regulations
Wildlife Act and Regulations

Fisheries Management

In the 1983/84 sportfishing season, approximately 300,000 resident and 78,000 non-resident freshwater angling licences were sold. This reflects a three-fold increase in angling demand over the last 20 years and emphasizes the need to protect, maintain, and enhance our native fish stocks by protecting and rehabilitiating fish habitat, introducing hatchery fish, and imposing angling regulations to limit harvest.

In 1983, approximately 9 million fish (trout, char and kokanee) were released into 780 lakes and streams throughout the province. In addition, 15 million eggs were collected for incubation and rearing at the six provincial hatcheries, as well as at numerous offsite incubation and rearing facilities.

Salmonid Enhancement Program

Since its inception in 1977, a major objective of S.E.P. has been to assess steelhead and sea run cutthroat trout stocks throughout the province. Regular activities include snorkel surveys, creel surveys, adult and juvenile marking programs, smolt enumeration, stream habitat surveys, habitat capability assessment, commercial fishery sampling, life history interpretation, and catch data analysis.

Efforts have also been underway to enhance depleted fish populations by planting fry and smolts in streams. In 1983, 29 streams were stocked with 822,000 steelhead fry and 187,000 steelhead smolts from provincial hatcheries. Adult returns from these releases will occur through the period 1986/89. Sea run cutthroat trout production included releases of 29,000 smolts into Vancouver Island streams, 61,000 fry and 30,000 smolts into Lower Mainland streams.

The assessment of growth, survival, and abundance of steelhead fry and parr was conducted on the first series of index streams throught the province. Estimates of potential habitat capability for steelhead production and standing stocks of fish will be modelled to forecast harvestable surpluses. Habitat surveys were continued to determine restoration and enhancement potentials, particularly for mitigation and compensation projects.

Research was continued to determine the feasibility of increasing fish production by stocking headwaters with fry, fertilizing streams to increase fish food abundance, installing stream flow control devices, and rearing fry to smolt size in net pens.

Inland Fisheries Management

Inland fisheries management is directed towards protecting and enhancing inland (non-searun) sportfish populations to meet angler demands.

The annual stocking of lakes with fingerlings and catchable-size rainbow trout is a major function of the provincial hatcheries in support of inland fisheries. In 1983, 5.6 million rainbow trout were released into 523 lakes. In addition, 1.9 million brook trout, Dolly Varden, and kokanee were released into 86 lakes and streams. Yellow perch were introduced into Charlie Lake in the Peace area.

Research continued on the effectness of aerating lakes to increase oxygen levels during the winter, thus, improving the overwinter survival of rainbow trout. Nine lake aeration projects in the Kamloops area have proven successful in preventing the winter kill of fish. The effect of size and release time on stocking kokanee fry in large lakes was evaluated. Methods for improving the quality of stocked rainbow trout and trophy fisheries are also being tested.

The eradication of undesirable coarse fish populations in lakes requires the poisoning of all fish species present. This is followed by restocking with desirable game fish to restore the fishery. Jimmy Lake, in the Kamloops area, was poisoned in 1982 as an emergency measure to eradicate lake chub and restocked in 1983 with rainbow trout. Hatheume Lake, similarly treated in 1980 to remove prickly sculpins, was also restocked. Two lake aeration projects in the Omineca area were undertaken this year, and two more were selected for possible future treatment.

The restoration of gravel quality in Meadow Creek spawning channel to increase egg-to-fry survival will

contribute to kokanee salmon stocks in Kootenay Lake. At Lac La Hache, shoal spawning area for kokanee was restored by the removal of weeds and placing of spawning gravel along a lake edge area. Okanagan Lake kokanee stocks will benefit from egg plants into Trout Creek and fry releases into Penticton Creek.

Conservation Officer Service

These Acts are enforced:
Federal Fisheries Act
Fisheries Act (Provincial)

Conservation officers spent 15% of their operational time on fisheries and habitat protection duties.

Statistics 1983	1982 (increase/decrease)
733 violations reported by public	+ 17%
1,978 violations found by conservation officers	+ 50%
816 Court proceedings instituted	+ 25%
566 convictions registered (79% rate)	+ 9%
1,281 warnings issued	+ 56%
244 cases unsolved	+ 27%
$54,245 fines levied	+ 2%

Steelhead Fishing: Licences, Anglers, Catch, Angling Days 1975- 1976 to 1983-1984

Year	Licencees	Number of anglers	No. of successful anglers	Total Catch		Total days of angling
				Kept	Released	
1975-76	29,594	20,265	8,770	31,490	26,546	219,797
1976-77	25,539	18,356	6,998	20,168	20,450	186,381
1977-78	23,406	17,143	7,038	18,154	27,047	174,721
1978-79	24,600	15,788	6,746	14,725	24,748	159,363
1979-80	25,095	14,755	6,384	12,663	26,906	134,569
1980-81	22,301	12,894	6,388	10,941	39,983	131,886
1981-82	23,425	12,964	6,175	9,965	47,739	126,508
1982-83	20,856	14,475	7,686	13,483	60,626	149,195
1983-84	20,576	14,929	8,569	15,191	83,688	173,962

Non-Resident & Non-Resident Alien Angling Licence Sales 1981- 1984

	1981/82		1982/83		1983/84	
	Number	$ Value	Number	$ Value	Number	$ Value
Non-resident	57,247	$286,235	38,977	463,220	37,033	$444,396
Non-resident alien (annual)	22,863	342,945	12,848	256,442	12,052	241,040
Six Day	29,668	178,024	29,110	290,739	28,529	285,290
Non-Resident, Non-resident alien Steelhead	2,214	22,140	2,087	30,886	2,218	33,270
Special Lakes	658	9,870	783	11,745	781	11,715
Special Rivers	1,168	29,200	1,200	30,000	1,227	30,675
TOTAL	113,818	$868,414	85,005	$1,083,032	81,840	$1,046,386

Resident Angling Licence Sales 1981-1984

(not including Habitat Conservation Fund impost fees)

	1981/82		1982/83		1983/84	
	Number	Value	Number	Value	Number	Value
B.C. Resident	336,735	1,683,675	285,263	2,612,395	269,133	2,691,330
Senior Citizen	28,768	28,768	30,115	30,115	30,538	30,538
Steelhead	21,181	63,543	19,106	103,846	17,895	107,370

Non-Resident Angling Licence Sales 1981-1984

(not including Habitat Conservation Fund impost fees).

	1981/82		1982/83		1983/84	
	Number	Value	Number	Value	Number	Value
Canadian Resident (Non B.C.)	57,247	286,235	38,977	463,220	37,033	444,396
Non-Resident (annual)	22,863	342,945	12,848	256,442	12,052	241,040
Non-Resident (short term)	29,668	178,024	29,110	290,739	28,529	285,290
Special Lakes	658	9,870	783	11,745	781	11,715
Special Rivers	1,168	29,200	1,200	30,000	1,227	30,675
Non-Resident (Steelhead)	2,214	22,140	2,087	30,886	2,218	33,270

1980 Angler Effort Distribution

REGION	ANGLER DAYS 1980			% INCREASE IN ANGLER EFFORT 1969/70-1980/81
	B.C. RESIDENT	NON-RESIDENT	TOTAL	
Vancouver Island (1)	466,500	41,400	507,900	17.9
Lower Mainland (2)	597,200	16,700	613,900	30.0
Thompson-Nicola (3)	741,400	139,900	881,300	17.6
Kootenay (4)	778,400	165,500	943,900	106.0
Chilcotin-Cariboo (5)	475,400	119,700	595,100	258.7
Skeena (6)	427,200	74,300	501,500	168.2
Omineca-Peace (7)	484,500	54,100	538,600	57.1
Okanagan (8)	580,800	50,800	631,600	57.9
PROVINCIAL TOTAL	4,551,400	662,400	5,213,800	61.5

Wildlife Management Program

The goal of the Wildlife Management Program is to maintain the diversity and self-sustainability of species representative of the major biophysical zones of the province and to ensure that, within the constraints of land capability and biological limits of each species, wildlife is available in sufficient abundance to meet the social, recreational, ecological and economic needs of society.

Consistent with that goal the objectives of the Wildlife Management Program are:

1) To maintain the natural diversity of wildlife species and their habitat.
2) To manage wildlife populations and habitat to provide consumptive use of wildlife consistent with program plans.
3) To manage wildlife populations and habitat to provide nonconsumptive use of wildlife consistent with program plans.
4) To minimize the danger to life and damage to private property caused by wildlife.
5) To promote new commercial uses and the maintenance of existing commercial uses of wildife, such as trapping and guiding industries.

Legislation Administered

Wildlife Act and Regulations
Migratory Birds Convention Act and Regulations
Game Export Act (Canada)

Wildlife Management

Under the new Wildlife Act and by consequential amendment to the Municipal Act, all firearms discharge restrictions, except those in Municipalities or other organized territory, are contained in the regulations under one Act. This should greatly enhance enforceability and availability of information for the public.

Big Game Inventory

Inventory of moose, mountain goat and caribou were increased, and in some instances seasons were liberalized as a result of increased population estimates.

The hunter harvest of moose in 1983 was 11,000, down slightly from the 12,000 in 1982. The mountain goat take of 923 and the elk take of 3800 were the highest obtained during the last eight years.

Elk populations in the Kootenays have, recovered from lows of the mid 1970s and the number of elk hunting permits made available is being increased.

Several transplants of mountain sheep, mountain goat, and elk were made to re-establish populations in areas where they formerly occurred, or to augment small isolated populations.

Biometrics

In 1982 a system was developed which assigned a unique I.D. number to each hunter.

Limited Entry Hunting participation involved 50,504 hunters and 17,729 authorizations offered in 454 different hunts.

Big game and bird hunters were randomly sampled by mailed questionnaires for information on their 1982 hunting activity. Approximately 120,000 responded. Additionally a mail survey provided valuable profile information on the province's 2,600 bow hunters. Hunters continued to participate in the Harvest Card program by submitting 4,100 teeth from deer, elk and moose.

A Wildlife Data Committee, formed in July 1983, will develop guidelines to ensure the collection of data appropriate to the needs of wildlife managers throughout B.C.

Endangered Species

Additional surveys of the Vancouver Island marmot were carried out, and the detailed plan "Status and Management of the Vancouver Island Marmot" was revised on the basis of public comment and released for final review in December 1983.

Sixteen burrowing owls were re-introduced to B.C. in the spring of 1983 and released in the Okanagan and Nicola Valleys.

Ninety-five young white pelicans were banded in August, 1983, on Stum Lake, to measure reproductive effort and success of this provincially endangered species.

Guided Hunter Activity

During the 1983/84 hunting season 3,339 big game hunters were guided by British Columbia's guide outfitters. Of this total, 145 were resident hunters, 121 were non-resident Canadian hunters and 3,073 were non-resident alien hunters. As in the past most hunters (78%) were from the United States but with significant numbers of hunters originating in West Germany and Austria.

Clients of British Columbia's guides killed 3,278 big game animals in 1983/84, slight increase over the previous year.

Total direct revenue from non-resident licences, guide licences and royalties totaled $1,437,525.00.

Trapping

Approximately 400 students completed Trapper Education Program courses during the year.

British Columbia's raw fur industry produced $3.8 million worth of furs in 1983/84.

A trapping regulation further curbed the use standard leg-hold traps.

A Trapper Assistance Program has completed its second year. Thirty-five thousand dollars were allocated in 1983 to help trappers obtain more humane traps. The Minister's Trapping Advisory Committee administers the fund and recommends trapping regulation changes.

Problem Wildlife Management

An increase in general predator complaints from 2,092 in 1982 to 3,087

in 1983 reflected significant increases in provincial black bear and coyote populations, and a higher number of human safety and minor nuisance complaints.

Wolf complaints decreased from 229 to 195. The number of livestock reported lost to wolves (142) did not change from 1982, but statistics may not reflect the true extent of wolf-related livestock problems.

A new permit for use of Compound 1080 in wolf and coyote control, contested by a number of environmental groups, was upheld by the Environmental Appeal Board in July 1983.

During 1983,120 wolves which had attacked livestock or caused concern for human safety were removed.

Wolves were removed from one area on Vancouver Island and two areas in northeastern B.C. to increase populations of deer, moose, elk, caribou and mountain sheep.

Successful trials with a high tensile electric fence which can be used to protect orchards, haystacks and other crop areas from elk and deer have been sponsored by the Ministry of Agriculture and Food. Fences are being constructed at locations in the Okanagan Valley and other areas where ungulate damage has been high.

Thirteen incidents with black bear and three encounters with grizzly bear resulted in injuries to humans in 1983. There were no human fatalities. The number of problem black bear complaints rose from 1,231 in 1982 to 2,202 in 1983; grizzly bear complaints decreased from 72 to 61. In response to complaints 61 black bear were trans-located and 572 destroyed. Only nine grizzly bear had to be destroyed, compared to fifteen in 1982. Sixteen were translocated, four more than in the previous year.

Wildlife Research

The third year of an integrated wildlife intensive forestry research program on Vancouver Island was completed successfully, with emphasis on field work and report printing.

A five-year cooperative project with the Ministry of Forests, examining the effects of forestry activities on grizzly habitat along the Kimsquit River, completed its second year.

Progress was made in the development of a Wildlife Habitat Handbook addressing the need to bring together existing knowledge on wildlife habitat requirements in a way that allows managers of wildlife, timber, and range to improve prediction of the consequences of their actions on habitat. During the second year a comprehensive problem analysis was completed, and a working plan or blueprint for the pilot handbook project was begun.

A project on the pathology of bighorn sheep was undertaken in cooperation with the Western College of Veterinary Medicine.

In cooperation with the Spatsizi Association for Biological Research, about 20 radio-collared caribou in norther B.C. were monitored monthly, and in detail at rut in October, to evaluate current census methods and recommend improvements.

Twelve reports were published on wildlife-related projects during 1983/84.

Habitat Management

Financial support from the Nature Trust of British Columbia (formerly the National Second Century Fund of British Colubia) was continued through 1983/84. Long term management rights (99 year leases) were acquired on seven sites, totalling approximately 386 hectares. Habitat protection for a wide variety of species was achieved via the Nature Trust purchases. Several others are still in the negotiation stage.

Protection of sites for fish and wildlife habitat and for specific short term uses continued as well.

The Habitat Management Section reviewed environmental impact reports for a number of metal mines and coal mines and recommended measures to reduce the impact of such developments on fish and wildlife habitat. Through its membership on the Reclamation Advisory Committee, the Section provided recommendations on many reclamation program applications. The Section also reviewed guidelines for metal mines and petroleum exploration. In cooperation with the Ministry of Energy, Mines and Petroleum Resources, the Section proposed a number of

changes to improve the administration of placer mining.

A review of the interagency referral systems through which the ministry negotiates management measures for fish and wildlife habitat was undertaken. In total, the regional and headquarters components of the Section process over 13,000 referrals a year.

The Public Conservation Assistance Fund assisted 23 conservation projects in a variety of wildlife and fisheries areas.

A variety of activities were initiated under tha auspices of the Habitat Conservation Fund. Licence surcharges produced a revenue of $1,418,541. Forty habitat enhancement projects were completed at a cost of $750,208.

During 1983/84, public response to the report entitled The Reservation of Old Growth Forests on Northern Vancouver Island, was received and analyzed. This report and the public response analysis will be submitted to the Environment and Land Use Committee of Cabinet for decision.

Over 300 applications for pesticide use on public lands were reviewed by the Habitat Management Section as a member of the Pesticides Control Committee.

The Ministry of Environment is still actively involved in a five-year intensive research project on fish/forestry interation on the Queen Charlotte Islands. This is a joint research project involving the Ministry of Forests and the Department of Fisheries and Oceans. The purpose is to assess and document the impact and the cause of landslides on the stream environment, fisheries resource and the forestry resource. The program is in its fourth year and preliminary reports are being published, in addition to a public newsletter. The program will be active until 1985/86.

For the past five years the ministry has been involved on the South Moresby Resource Planning Team, preparing a report on the alternative resource development options in this relatively wild area. A Ministry of Environment position paper has been submitted and early in 1984 the Planning Team submitted their report to the Environment and Land Use Committee of Cabinet.

The ministry and the Ministry of Transportation and Highways continued their cooperative program to ensure adequate protection of the valuable fisheries resource associated with the route of the Coquihalla Highway.

In April, 1983, seventy participants, representing the forest industry, Ministry of Forests, Ministry of Environment and the Department of Fisheries and Oceans, met to initiate a review of the existing coastal logging guidelines and established working groups to draft new guidelines. A committee was also formed to establish a Stream Classification for British Columbia.

Conservation Officer Service

Conservation officers spent 46.5% of their total time on wildlife enforcement duties.

Statistics 1983		1982 (increase/decrease)
2,102	violations reported by public	- 21%
3,142	violations found by conservation officers	+ 22%
428	violations unfounded	
4,816	total actual violations	+ 5%
2,004	Court proceedings	+ 35%
1,334	convictions	+ 35%
1,325	warnings issued	+ 11%
758	cases unsolved	+ 29%
$139,397	fines levied	+ 29%

Compliance Rate = 82%

Conservation officers spent 12% of their time handling nuisance or dangerous wildlife complaints and responded to 1,491 of 5,966 complaints from the public in this regard, as follows:

	Complaints Rec'd	--Acted on
Black bear	2,202	982
Grizzly bear	61	31
Cougar	276	100
Wolf	195	123
Other	3,232	255

British Columbia Wild Fur Harvests 1978-1983

Species	Number of Pelts by Fur Harvest Year					
	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Beaver	16,662	20,413	24,309	18,166	14,895	11,815
Muskrat	52,142	40,426	35,540	30,798	27,606	21,580
Mink	3,455	5,266	7,686	5,961	4,086	4,110
Otter	861	834	939	747	702	429
Coyote	4,656	5,290	4,691	2,949	4,018	3,506
Fox	654	571	634	590	609	831
Wolf	443	406	268	228	194	184
Weasel	5,322	5,723	9,139	6,171	2,827	3,840
Wolverine	383	275	283	225	214	265
Skunk	15	24	38	23	34	22
Fisher	657	472	570	551	635	941
Marten	23,719	21,312	32,732	30,163	23,656	23,434
Lynx	1,119	1,577	2,848	3,693	5,463	6,264
Bobcat	289	240	140	130	231	184
Squirrel	44,451	73,830	183,110	76,209	33,949	79,348
Racoon	1,002	1,486	1,179	615	1,473	667
Black Bear	328	566	480	358	295	382
TOTAL VALUE in $(Millions)	2.1	3.6	4.1	3.6	3.4	3.8

Gross Revenue from Resident, Non-Resident and Non-Resident Alien Hunting and Angling Licence Sales 1981-1984

	1981/82	1982/83	1983/84
Resident Hunting	$2,774,141	$4,729,839	$4,683,492
Resident Angling	$1,775,986	$2,746,356	$2,829,238
TOTAL	$4,550,127	$7,476,195	$7,512,730
Non Resident, Non Resident Alien Hunting	$1,246,294	$1,292,583	$1,252,422
Non Resident, Non Resident Alien Angling	$ 868,414	$ 792,293	$ 761,096
TOTAL	$2,114,708	$2,084,876	$2,013,518
Firearms, Misc. Hunting, Duplicate Licences	$ 66,921	$ 126,329	$ 128,656
Duplicate Angling	$ 1,953	$ 6,156	$ 7,788
TOTAL	$ 68,874	$ 132,485	$ 136,444
GRAND TOTAL	$6,733,709	$9,693,556	$9,662,692

Non-Resident & Non-Resident Alien Licence Sales 1981-1984

	1981/82		1982/83		1983/84	
	Number	$ Value	Number	$ Value	Number	$ Value
Non-resident alien	3,835	$287,625	3,340	$300,270	3,279	$295,110
Non-resident	787	5,509	631	8,818	678	9,492
Non-resident alien small game	443	11,075	334	13,360	341	13,640
Black bear	1,874	74,960	1,626	81,150	1,646	82,300
Caribou	462	46,200	440	52,780	373	44,760
Cougar	66	6,600	41	4,900	23	2,760
Deer	1,017	50,850	757	45,350	872	52,320
Elk	792	79,200	648	77,680	734	88,080
Grizzly bear	713	213,900	628	217,410	611	195,520
Moose	2,618	261,800	2,180	261,380	2,112	253,440
Mountain Goat	640	64,000	610	79,060	590	76,700
Mountain Sheep	422	105,500	381	114,250	336	100,800
Wolf	521	39,075	418	36,175	375	37,500
TOTAL	14,190	$1,246,294	12,034	$1,292,583	11,970	$1,252,422

Resident Hunting Licence Sales 1981-1984

	1981/82		1982/83		1983/84	
	Number	$ Value	Number	$ Value	Number	$ Value
B.C. Resident	163,982	$1,147,874	143,587	$1,838,132	134,080	$1,877,120
Senior Citizen	10,106	10,106	10,515	10,518	10,589	10,589
Black Bear	22,289	89,155	17,135	124,796	17,537	140,296
Caribou	1,556	15,560	1,063	21,190	1,081	21,620
Cougar	624	6,240	442	8,040	415	8,300
Deer	138,171	552,684	131,493	1,045,444	117,757	942,056
Elk	15,825	158,250	14,866	296,510	15,985	319,160
*Grizzly Bear	2,158	75,530	1,162	62,520	1,033	72,310
Moose	63,355	633,550	53,652	1,069,430	50,690	1,013,800
Mountain Goat	2,232	33,480	1,489	44,535	1,729	51,870
Mountain Sheep	2,068	51,700	1,494	74,075	1,509	75,450
LEH Hunting Auths.	12,476	-	14,210	-	17,729	-
LEH Hunting Apps.	31,000	*	44,883	134,649	50,307	150,921
TOTAL	$465,842	$2,774,129	435,937	$4,729,839	420,441	$4,683,492

*No fee.

Estimates of Resident Hunter Harvest 1978-1979

Year	Hunting Licence Sales	Deer	Moose	Elk	Goat	Sheep	Grizzly Bear	Black Bear	Caribou	Cougar
1978	155,605	28,550	12,688	1,273	461	235	124	3,076	143	174
1979	163,088	29,965	13,045	1,471	366	188	148	2,731	148	129
1980	167,879	36,079	12,486	1,354	427	210	205	5,670	141	92
1981	163,982	35,200	10,750	1,800	420	220	180	3,250	140	156
1982	143,587	34,800	10,900	2,530	410	185	190	3,180	150	111

Year	Grouse	Ducks
1978	485,781	181,205
1979	478,579	160,307
1980	306,057	145,549
1981	214,656	145,713
1982	258,461	117,564

Summary of Guided Hunter Activity in the 1983-1984 Hunting Season

Region	Number of Active Guide Outfitters	Number of Active Assistant Guides	Number of Guided Resident Hunters	Number of Guided Non-resident Canadian Hunters	Number of Guided Non-resident Alien Hunters	Moose	Mountain Goat	Caribou	Deer	Mountain Sheep	Grizzly Bear	Black Bear	Elk	Cougar	Wolf	Upland Birds	Waterfowl	Other
1	7	12	92	1	79	0	0	0	149	0	0	90	0	1	0	0	0	24
2	3	5	0	0	25	0	2	0	1	0	0	18	0	0	0	0	0	0
3	11	17	2	1	59	16	6	0	7	2	0	12	0	0	0	0	0	0
4	38	137	3	57	514	10	56	0	94	2	8	110	154	3	0	0	0	1
5	71	96	17	6	599	264	6	9	46	3	6	29	0	0	1	44	5	1
6	57	150	4	15	632	243	139	61	6	51	56	138	0	0	13	26	0	5
7	88	284	16	38	1133	623	124	97	3	118	86	170	115	0	8	113	10	8
8	11	25	12	3	74	0	1	0	18	6	0	45	1	9	0	11	0	3
* Prov. Totals	267	693	145	121	3073	1156	334	167	324	182	156	612	270	13	22	194	15	42

* Some guides and some hunters were active in more than one region, hence the sum of the regional figures in some guide and hunter categories exceeds the number given for the province.

General Results of the Limited Entry Hunting Season 1983-1984

Species	Applications for Licence	Licences Available
Caribou	506	130
Elk	15,487	5,928
Grizzly Bear	323	39
Moose	17,026	6,040
Goat	4,625	1,487
Sheep	2,090	185
Blacktailed Deer	6,382	2,265
Whkitetailed Deer	4,065	1,655
Total	50,504	17,729

Marine Resources Program

This program provides for management and development of oyster and marine resources (as well as mariculture generally) and regulation of the fish processing sector of the British Columbia commercial fishing industry. The program provides services for these responsibilities under the British Columbia Fisheries Act and Fish Inspection Act by:

- Issuing fish processing licences, fish buyers licences according to policies designed to ensure benefits to British Columbians.
- Creating a favourable climate for the maintenance and expansion of the shellfish culture industry through the provision of technical services to growers.
- Increasing opportunity for recreational use of shellfish.

Legislation Administered

Fisheries Act (Canada) and Regulations
Fisheries Act (B.C.) and Regulations
Fish Inspection Act and Regulations

Marine Resources

This program encompasses responsibility for management of oysters and marine plant resources, licencing fish buyers and processing plants and regulating the sale and handling of commercially caught fish in British Columbia.

Inspection, Licensing and Enforcement

Processing plant licences numbered 213; 4 percent more than 1982; 422 species specific decals were issued.

There were 500 fish buyers' licenses issued - 9 percent less than 1982, with the attendant number of decals being 746, 8 percent less than in 1982.

There were 347 fisherman's vending licenses issued. This license is intended to ensure accurate records of domestic over-the-side sales of fish. Since the inception of this license the annual sales slip records have increased from approximately $545,000 to $2,455,000.

Field activities were directed toward maintaining and upgrading the processing, buying and retailing sectors by promoting quality, wholesomeness and consumer protection in fish products. Approximately 650 inspections were conducted.

Finfish Policy and Resource Development

Provincial interests were represented at negotiations between Canada and the United States to limit and coordinate their interceptions of B.C. origin salmon. Marine Resources Branch staff supported the trend of the negotiations and assisted in the development of clauses which will ensure that British Columbia fishermen are entitled to a catch of salmon commensurate with the value of salmon produced in British Columbia waters.

At the International North Pacific Fisheries Commission negotiations similar support and initiative was provided by the Province to protect both B.C. salmon and steelhead from capture in the North Pacific, outside of the 20 mile limit.

The fish buyer and processor licence system is being monitored to reflect the existing activities in the industry and develop provincial policies which will assist in stabilizing the industry.

Mariculture Development

Joint research with the federal Resource Services Branch was undertaken to develop the commercial potential of rainbow trout reared in seawater.

Management of fish mariculture activities on Crown foreshore has been initiated through an agreement between the Ministry of Environment and Ministry of Lands, Parks and Housing. Production monitoring and assessment systems are being developed.

Shellfish Industry Development

As of December 31, 1983, 164 shellfish growers were registered. This represents an increase of 26 percent over 1982 and a 49 percent increase over 1978 when only 144 and 81 growers were registered respectively.

The total number of land tenures recorded for shellfish culture were 303 at year's end, 40 additions, 19 deletions and with three other status changes recorded. The total area for shellfish culture as of the end of 1983 was 1425 hectares, a 6 percent increase over 1982.

The harvesting of the long line oysters project was completed, as was most of the processing. Of the original 14,000 strings hung approximately 50 percent were harvested. Most losses were a result of the failure of some of the experimental stringing techniques.

The Ladysmith Harbour project has demonstrated to this point that bottom culture in the test plots is not a feasible proposition due to severe stunting resulting from siltation. Near bottom cultured shellstock grow well and exhibit excellent condition. The control area in the outer harbour exhibited superior growth attributed to better water quality and circulation. This project will be concluded next year.

This year is the third year of the scallop culture feasibility project to determine the opportunity for scallop culture in B.C. This is a joint federal/provincial program, and this year a Japanese technician was imported by the federal government to assist researchers in solving the problems of lack of survival of scallop larvae. Results from this approach are expected in 1984.

Extension and Liaison

The technique of hatchery-produced eyed larvae setting is gaining acceptance in the industry and the "how to" report published by the ministry is in great demand. Eight companies reported using this technique, and about 120 million larvae have been sold to growers for this purpose.

Kombu (Edible Kelp) Development

Three years after harvest only one Laminaria plot had recovered; two others had attained densitives of only 60 and 33 percent of their respective controls. Cultivation of laminarian species is an attractive alternative to wild harvest; commercial interest is growing as entrepreneurs search out markets for both food and medical products. An application for a very large lease off Malcolm Island is being processed. A workshop was held to transfer the latest information on kombu culture technology, processing and mariculture lease policy.

Water Management Program

The goal of the Water Management Branch is to manage the Provincial water resources to maximize the contribution these resources make to the social and economic development and well-being of all British Columbians.

Objectives Include:

1. A high level of water resource quality for groundwater, fresh surface water and estuarine and coastal marine waters achieved through: the establishment of resource quality objectives; water quality monitoring; watershed planning; referral and consultative processes; and assistance in the control of nuisance aquatic vegetation.
2. Assured protection of licensed private rights and instream uses through allocation and regulation of the supply and use of surface water under the Water Act.
3. Reduced potential for property damage and loss of life due to flooding and erosion by: runoff forecasting; snow surveys; emergency action; regulation of floodplain development; investigations for and implementation of flood and erosion protection projects; and inspection and maintenance enforecement for dykes and dams.
4. An assured adequate level of water service to the public served by privately-owned utilities or requiring works to appropriate technical standards; regulating water utilities; and providing technical support, including project management, to funding ministries.
5. An adequate information base on the supply capability of surface water and groundwater resources through the collection, storage and analyses of data.
6. A high level of public health engineering support for the Ministry of Health through approvals and inspection of water supply sources, supply and treatment works, swimming pools and waste disposal systems.
7. A water management program which is managed cost effectively through: planning, budgeting, fiscal control, program evaluation, asset control, effective communication systems, personnel system administration, administrative support services, technical support system; and staff safety and training.

Legislation Administered

Water Act and Regulations
Drainage Ditch and Dyke Act
Dyke Maintenance Act
Water Utility Act
Libby Dam Res. Act

Water Management

Allocation Regulations, Licensing

During this fiscal year, 972 applications for new water licences were received and 1,381 conditional water licences and 83 final water licences granted, along with 592 associated permits to occupy Crown land. At the end of the fiscal year 3,185 applications were awaiting decision regarding the issue of water licences. As of March 31, 1984 there were 35,960 active water licences on record.

The issue of approvals under Section 7 of the Water Act is largely the responsibility of the Regional Water Managers. A total of 1,123 such approvals were issued during the period under review.

During the fiscal year seven appeals to orders of the Comptroller were heard by the Environmental Appeal Board and nine appeals to orders of the Engineers by the Comptroller.

A total of 145 new water licensing maps were produced in response to requests by the regional offices. The new mapping replaced 39 water rights maps, some of which were 50-60 years old. A total of 1,325 new maps have been sent to the regional offices to date and a further 806 B.C.G.S. maps remain on hand to be processed.

Power and Special Projects

The Power and Special Projects Section has maintained continuing involvement in a number of proposed hydro-electric power developments throughout the province including the Stikine-Iskut and Liard Projects in northern British Columbia, the Keenleyside-Murphy Projects in the Columbia River System, and the Homathko Project located in the southwest coastal region of the province.

The application by B.C. Hydro to construct a power development at Site C on the Peace River was refused by Cabinet, following lengthy public hearings held by the B.C. Utilities Commission. The water license application was subsequently refused by the Comptroller.

The Revelstoke Hydro-electric Project is scheduled for completion by October, 1984. Filling of the reservoir commenced October 11, 1983. Section staff and two specialist consultants continue to assess the engineering aspects of the dam.

Negotiations with Alberta on a long term agreement on management of transborder flows continued during the year as did involvement in the McKenzie River Basin Committee.

The Comptroller was represented on a joint technical committee of Alcan, federal government and provincial government representatives. The committee reported on the potential impacts of the proposed Kemano completion project with particular reference to the regulated release of stored water authorized by the existing water licence.

Reviews of water licensing requirements for several mining and industrial developments were completed, including metal mines, coal mines in the Southeast Kootenay area, the North-East Coal Block and on Vancouver Island, and proposed liquid natural gas pipelines.

Skagit Valley Flooding

Following some eight years of negotiations with the City of Seattle and the International Joint Commission, the Skagit Valley flooding issue was finally resolved with the signing by the Minister of Environment and the Mayor of Seattle of the "British Columbia-Seattle Agreement" on March 30, 1984.

The main elements of the Agreement are:

- High Ross dam would not be constructed.
- Seattle will, over a 35 year period, pay British Columbia what the dam could have cost if constructed with money borrowed in 1982.
- B.C. to supply power to Seattle for 80 years.
- B.C. can raise Seven Mile Dam to flood into Washington State at nc charge.
- An environmental fund of $5,000,000 to be set up with Seattle contributing 80 per cent.

Libby Reservoir Preparation Program

During the 1983/84 fiscal year $130,000 was spent on fish and wildlife studies, bringing the total program

expenditures to $19,820,000.

The Province has fulfilled its obligations, and the program is now considered to be terminated.

Flood Damage Prevention

Runoff Forecasting

Forecasts of total volume for the spring and summer snowmelt period for all major rivers and reservoirs in the province were made. Computer models were activated, weather and streamflow data were collected and predictions of water flows and levels were made as required. However, with below average snowpacks in the upper Fraser basin and close to average snowpacks in the Thompson basin, there was little likelihood of damaging floods during the 1983 freshet. The flood warning system for the Squamish River was activated in the fall with weather, snow conditions and streamflow data being collected. Two significant peaks occurred, but in neither case was there any major flood damage.

Snow Surveys

During and prior to the snowmelt period, 1,231 snow surveys were carried out at the province's 260 permanent snow courses. The measurements were published in the six issues of the Snow Survey Bulletin.

Floodplain Development Control

A total of 367 Zoning Bylaws, Bylaw Appeals and Official Community and Settlement Plans were dealt with. A total of 1,069 subdivisions and 469 Crown Land Lease and Fee Simple Applications were reviewed for flood control requirements. A total of 31 land referral issues to do with Flooding Reserves and Ecological Reserves were processed.

Floodplain mapping was completed for the following areas: Columbia River at Revelstoke; Fraser and Nechako Rivers at Prince George; Kaslo River at Kaslo; Squamish River; Similkameen River - U.S. Border to Princeton. A total of 670 map sheets were issued during the year in response to requests from government offices and the private sector.

Dyke Maintenance

During 1983/84, inspections were carried out in all dyking districts in the Lower Fraser Valley, Squamish, and Pemberton.

The Provincial Emergency Flood Plan for the Lower Fraser Valley was reviewed and a close watch was kept on several possibe problem areas in the Lower Fraser Valley.

Drainage

The majority of drainage projects are initiated through requests under the Federal-Provincial Agriculture and Rural Development Sub Agreement (ARDSA).

Drainage studies were completed for two projects during the year. Projects under construction included East Chilliwack, Pitt Meadows, Burrows Ditch (Surrey), Somenos and Richards Creeks (North Cowichan) and Crescent Slough (Delta). The latter two projects were completed. Total value of construction during the year was $3,041,000.

Dam Safety

The Provincial Dam Safety program covers more than 2,000 existing storage structures, of which 146 are classified as major dams. The latter are the responsibility of the Victoria office, which carried out 81 regular and follow-up inspections during the 1983/84 fiscal year requiring remedial works to 35 dams.

Channel Clearing and River Protection Assistance

During 1983/84 over 100 individual requests for assistance were received and investigated.

At the beginning of the year the Minister announced an accelerated dyking program to be funded by the Employment Development Program. This provided an opportunity to intiate 16 major projects under this Program at a total cost of $11.3 million.

In addition to these major projects, 22 smaller projects through-the River Protection Assistance Program at a total cost of $402,000 while 17 stream clearing projects were under-out the Province were completed under taken at a cost of $63,600.

An additional Project completed

during the year included a five year ARDSA assisted Program to rehabilitate and extend the Pemberton Dyking District flood and erosion protection work. The total cost of this project amounted to $3,412,285.

Another ARDSA project was also completed at a cost of $1,230,000 on the Similkameen River to provide flood and erosion protection for the Indian Reserve #7.

Fraser River Flood Control

This Program, carried out under a Federal-Provincial Agreement signed in 1968, allows for an expenditure of $120 million. Expenditures to March 31, 1984, totalled $109.3 million while expenditures for the fiscal year 1983/84 amounted to $9.6 million.

Special Studies Geohydraulics

Investigations were carried out and reports prepared for a number of landslides and debris torrents. A joint investigation and design of mitigative measures with the Ministry of Transportation and Highways is continuing on slide problems along the Squamish Highway, affecting both traffic and local communities.

Water Quality

Significant progress was made in initiating the developement of surface water quality objectives. These water quality objectives are being set to protect water uses in specific water bodies. They will also provide a yardstick against which the state of water quality at a particular site can be checked. Work was in progress on nineteen waterbodies in the province. In addition, monitoring was carried out in a large number of lakes south of the 56th parallel, in an area which up to now lacked data on lake sensitivity to acid rain.

Studies were carried out at the request of outside agencies to identify and correct water quality deterioration in several lakes.

The Groundwater Section undertook investigations, and otherwise contributed to 13 environmental impact assessment studies for major developments, 7 groundwater protection studies, and various groundwater quality concerns related to natural phenomena, the disposal of wastes, and accidental spills.

Protection of Community Watersheds

A draft policy was prepared for the integration of forest and water management planning related to forestry activites on Crown land. Along with the earlier developed "Guidelines for Watershed Management of Crown Lands used as Community Water Supplies", this policy is intended as the basis for management of community watersheds.

Littoral Resources

$160,000 was allocated to provide 75 percent of the operational costs of Eurasian water milfoil control projects in high use public recreation areas of six mainstem Okanagan Valley lakes and in Shuswap and Cultus Lakes.

Surveillance efforts for Eurasian water milfoil were limited to five valuable recreational lakes in the Kootenay Region and several lakes in the Shuswap Region. No new populations of Eurasian water milfoil were observed in these lakes.

Aquatic Resources

The B.C. Aquatic Data Base continued to store stream data for the Ministry of Environment, the Yukon Government and industry.

During fiscal year 1983/84, seven small stream systems and 35 lakes were surveyed as part of Ministry of Environment projects.

Groundwater

During the fiscal year, 647 water well records were collected from drilling contractors and a total of 51 water well records were completely processed.

Groundwater Section staff have answered 636 general enquiries for groundwater data and monitored water level fluctuations in 144 observation answered 636 general enquiries for groundwater data and monitored water level fluctuations in 144 observation wells, located in various parts of the province.

The Groundwater Section undertook 15 assessments involving groundwater supply potential and groundwater use conflicts.

Storage Inventory

Six reservoirs were surveyed in 1983/84 and 27 maps and drawings were completed and distributed to regional offices and other requesters.

Surface Water

The federal/provincial network of hydrometric stations was augmented by 30 new stations, while 24 stations were discontinued during the year.

Supply Project Feasibility Studies

Water supply projects are initiated under the Federal-Provincial Agriculture and Rural Development Sub Agreement (ARDSA). Feasibility studies were completed for eight projects which were under consideration for ARDSA funding for the final year of the Agreement.

Water Supply Project Implementation

Eight ARDSA projects were being constructed during the year. Total constrution during the year was $1,630,000.

Community Water Supplies

The authority to construct and operate these water systems is indicated by a Certificate of Public Convenience and Necessity issued by the Comptroller under the Utilities Commission Act. In the 12 month period ending March 31, 1984, 41 applications for certificates were received. A total of 37 certificates were issued during the year.

A total of 105 orders of various kinds were made by the Comptroller and 37 new or amended tariffs were examined and accepted for filing.

Public Health Engineering

A total of 400 waterworks certificates of approval under the Health Act were processed during the reporting period . During 1983/84, 99 pool approvals were processed.

Services were provided to the provincial epidemiologist to investigate an outbreak of salmonella thought to be associated with the drinking water supply of a large Fraser Valley community.

Regulation of Okanagan Lake

The fifth highest freshet inflow volume on record was managed such that Okanagan Lake did not exceed its normal full pool elevation during 1983 despite the fact that the inflows during each of January, February and March were the highest on record.

Vedder River Management Area

1983/84 saw not only the approval of the Vedder River Management Area Plan by the Fraser River Joint Advisory Board, but the completion of construction of the setback dykes. Final bank grading and seeding is almost complete.

Conservation Officer Service

This program enforces the Water Act.

Conservation officers spent a total of 2% of their operational time on enforcement of the Water Act.

Statistics 1983	1982 (increase/decrease)
67 complaints reported by public	- 16%
45 violations found by conservation officers	+ 55%
3 Court proceedings instituted	- 66%
6 convictions registered	+600%
$1,600.00 fines levied	+457%

Water Licensing Rentals and Fees 1981-1984 Revenue

	Year ending Dec. 31, 1979	15 months ending Mar. 31, 1981	Year ending Mar. 31, 1982	Year ending Mar. 31, 1983	Year ending Mar. 31, 1984
POWER	$ 13,703,814	$ 35,274,542	$ 94,900,216	$ 189,808,981	$ 172,739,369
WATERWORKS	218,256	233,929	337,579	274,896	495,247
IRRIGATION	24,267	28,610	24,298	32,314	48,652
OTHER RENTALS	613,735	1,297,817	1,134,053	1,110,872	1,116,420
APPLICATION FEES	92,209	130,679	202,616	314,499	167,680
INTEREST					1,241
TOTAL REVENUE	$ 14,652,281	$ 36,965,577	$ 96,598,762	$ 191,541,562	$ 174,568,609

Note:
- Power revenue is that received from public utilities and other major operators. Small private developments are included under other rentals
- Waterworks and Irrigation revenue is that reveived from local authorities responsible for distributing water to their residents. Revenue from water utilities, individual irrigation users is included under other rentals
- Other rentals includes charges noted above plus rentals assessed for Industrial, Mining, Domestic, Storage and other purposes and for Permits to Occupy Crown Land

- Reporting period changed from calendar year to fiscal year as of March 31, 1981
- Power rentals subject to annual indexing
- All Water Licence rentals and fees increased as of January 1, 1982
- Interest charged on overdue acounts exceeding $100 a year as of January 1, 1984.

Number of Active Water Licences

As of December 31, 1979	33,012
As of March 31, 1981	34,100
As of March 31, 1982	34,295
As of March 31, 1983	34,520
As of March 31, 1984	35,960

Air Management Program

The goal of the Air Management Program is to maintain atmospheric quality in British Columbia at a level conducive to good health and a quality environment; to provide atmospheric information necessary for the management of British Columbia's resources.

The objectives of the Air Management Program are:

1. To establish air quality standards and to monitor major airsheds in the Province to ensure the standards are maintained.
2. To develop and implement airshed management systems to ensure air quality which is conducive to good health and to maintenance of the Province's natural resources.
3. To provide atmospheric data and expert services to Ministry programs and other agencies.
4. To regulate weather modifications.

Legislation Administered

Environment Management Act

Air Management

The goal of the Air Management Program is to maintain atmospheric quality in British Columbia at a level which is conducive to good health and a quality environment; to provide atmospheric information necessary for the management of British Columbia's resources.

Air Quality Standards & Monitoring

Air quality monitoring was conducted at about 750 locations in the province. This included the operation of the 33 continuous air monitors and approximately 20,000 laboratcry analyses of airborne pollutants. The special monitoring projects in Prince George and Kamloops continued to address the high level of pollutants in these two areas.

The audit of all the continuous air quality monitors operated by industry was repeated to ensure that the data collected by industry meets ministry standards.

Program staff participated in the joint industry/government committees monitoring coal dust levels in northern B.C. and investigating coal dust problems in the southeast Kootenays.

An assessment of Nanaimo air quality was completed to determine a monitoring strategy for the area. Based on the assessment, modification to the monitoring network has been made.

To enhance the ministry's enforcement capability for air emissions, an air emissions engineer was hired, and a "hands-on" stack sampling training course was developed for the Ministry's staff. To coordinate the various activities involved with emissions testing a ministerial procedure for emission testing was drafted. A new provincial code for sulphur dioxide emission was completed.

For smoke capacity monitoring, a total of four training courses were provided to industry as well as to ministry staff.

A project was initiated to develop a method of auditing the industry's analyzers for continuous monitoring of the emissions of sulphur compounds.

Development of new environmental data management systems began to replace EQUIS. The non-continous air quality information will reside in SEAM (System for Environmental Assessment and Management), while the continuous air quality data will reside in CAMIS (Continuous Air Monitoring Information System).

Airshed Management

Acid rain projects included installation of six permanent provincial stations which complement the federal government's eight stations.

An assessment of air quality trends in the province was initiated to determine if there have been any significant changes in the levels of major pollutants over the past seven years.

The assessment of Prince George air quality for the year of 1983 was initiated and the final draft report completed.

Staff reviewed 30 environmental assessment reports for various proposed projects. Sixty applications for new permits and amendments were reviewed.

Atmospheric Data & Expert Services

Computerized data files containing all air quality data for the province were maintained.

An annual air quality report for the province for the year 1980 was prepared for the first time.

The operations of 162 meteorological stations were coordinated by the program collecting data on temperature, precipitation, wind and solar radiation.

Staff responded to a total of 286 individual requests for climatological data from government and the public.

A report, "Farm Weather Service Needs in the Lower Fraser Valley," was presented to the British Columiba Agrometeorology Subcommittee.

A total of 12 Climatic Capability for Agriculture maps were completed at the request of the B.C. Land Commission.

Computerized data files of all climatological data for the province were maintained.

Waste Management Program

The goal of the Waste Management Program is to protect the environment of British Columbia by controlling the impact of polluting substances.

The objectives are:

1. To preserve the quality of the air in the Province at or above acceptable levels by managing the discharges of pollutants to the atmosphere.
2. To preserve the quality of the water environment of the Province at or above acceptable levels by managing the discharge of pollutants.
3. To preserve the quality of the land environment of the Province at or above acceptable levels by managing the discharge of pollutants.

Legislation Administered

Waste Management Act
Environment Management Act
Litter Act

Waste Management

General

A major thrust was made this year towards ensuring a higher level of permit and approval compliance.

As an alternative to a discharge permit, municipalities may choose to adopt a Waste Management Plan. Two major plans are currently under development. The first encompasses refuse in the three Lower Mainland regional districts. The second addresses effluent disposal from the City of Vernon.

Throughout the years Waste Management has carried out environmental monitoring programs. Data have been collected and assessed from a province-wide network of water monitoring sites. A recent study was undertaken to ascertain whether long term changes in water quality have occurred at these sites and whether these changes have resulted in a positive or negative impact on the aquatic environment. The results of the study were published early this year in a report entitled "A Trend Study of Water Quality in British Columbia."

Technical Services Section

The Iona Sewage Treatment plant serving the urban core of metropolitan Vancouver was built in 1962 and is the largest plant in the province. Environmental surveillance in the immediate vicinity of the plant has now indicated that successive plant expansions have overstressed the ability of the tidal flat area of Sturgeon Bank to support marine life. Studies have shown that increased capacity at the plant and construction of a new outfall terminating in deep water offshore would satisfy both the public health requirement for recreational water quality and the protection of marine life.

The Thompson and Okanagan valley waterways have been identified as being particularly sensitive to the addition of nutrients. The communities of Kamloops and Merritt in the Thompson watershed have projects underway to reduce nutrient levels in their sewage discharges year-round.

Similar concerns apply in the Okanagan where the Canada British Columbia Okanagan Basin Agreement task force advisory committee recommended a 90 percent phosphorus reduction as a target objective for all of the major local communities. Penticton and Vernon have responded with the addition of precipitant chemicals to their existing treatment systems. Kelowna responded by converting their plant to the pioneering South African Bardenpho system which removes nutrients to the required degree without using chemicals. Trials are presently underway in Vernon to determine the efficiency of bacteria and virus removal using chemical precipitation and rapid sand filtration. Technical advisory staff directed the original nutrient removal studies and are performing a similar function in respect of the bacteria and virus removal studies.

Considerable effort was expended by technical staff in the preparation of a state-of-the-art review of the aluminum smelting industry in anticipation of the proposed new smelter at Vanderhoof.

Resource Recovery

New regulations are being prepared for the return of beverage containers. Meetings have been held with industry and they have undertaken to limit the discharge of empty containers to garbage and litter. On this basis it is not anticipated that the present refund system will be changed significantly.

Studies have been completed on the broader issues of improving markets for material recovered from wastes. One by H.A. Simons Ltd. reports on the practicality of retrieving tires as a fuel or for other uses.

Significant steps have been taken to better the retrieval of glass, and the two British Columbia bottle manufacturers now accept in excess of 5,000 tons of cullet (broken bottles).

Environmental Safety

In September 1983, a joint proposal by Genstar and IT Corporations to develop and operate a special waste management system for B.C. was endorsed.

Simultaneously, the Ministry announced the two most technically suitable areas for the secure landfill component of the special waste management system. These areas, located in the Ashcroft-Spences Bridge region met geological, climatic, socio-economic, and land-use criteria required for such a facility.

The introduction of the Waste Management Act's special waste regulations took place in February 1984. These regulations address methods of defining special wastes and completing and handling of special waste transportation manifest forms, containers for transporting special wastes, licensing of special waste carriers, and procedures for chemical analyses of wastes.

Activity in the Ministry's special waste information programs increased significantly this year. Special waste open houses in Ashcroft and displays in Lower Mainland shopping malls were well received.

Regional Special Waste Storage Facilities throughout the province received a variety of waste chemicals from households and institutions. During this period, 36 large drums of these materials were shipped to licensed sites in the United States for disposal.

Approximately 514 reports of spills of dangerous goods and special wastes were received. The most significant events included the dumping of 67 barrels of waste solvents at a gravel pit in Surrey, the spill of 10,000 gallons of a wood preservative solution from two storage tanks at a paint company in Surrey, and the spill of 60,000 gallons of material containing cyanide from a mining company into Highmont Creek.

Vancouver Island

Ten major industrial operations in the region were contacted about the preparation of spill contingency plans.

Requests for pickup and disposal of waste chemicals are increasing. This year some 22 drums of chemicals were shipped out of the region.

Westmin Resources are constructing on land tailings disposal facilities which will handle the current production and the expanded operation. The H.W. Mine expansion should be completed next year.

Meetings continued with the Capital Regional District regarding improvements to the area's east coast sewage disposal procedures, and the interception and collection of various storm water overflows in the Greater Victoria area.

Work began at the Hartland Road Landfill in Victoria on the installation of groundwater monitoring wells and construction of a retaining berm along the southern boundary of the landfill.

The Capital Regional District approved the installation of a septic tank waste dumping station in Victoria.

An extensive well monitoring program was undertaken to assess public concerns about the possibility of leachate from the Qualicum Beach Landfill affecting groundwater quality in the area.

Bear/people conflicts at North Island landfills continue to be a concern for both waste management and wildlife personnel. Changes in site operating procedures appear necessary.

Lower Mainland Region

Emphasis was placed on ranking and rating all active permits. Non compliance was reduced from 31% to 25% and effort to reduce this level is ongoing.

Continued negotiation with the Fraser River Harbour Commission and the Municipality of Richmond resulted in further improvements and upgrading of the municipal landfill leachate treatment system at Richmond Landfill.

An extensive one year study and report on "Fraser River Water Quality At The Pattullo Bridge" has been completed. This report documents the Fraser River Water Quality as it enters the metropolitan areas.

Omineca-Peace Region

The Cities of Prince George and Dawson Creek completed the upgading of their sewage treatment works.

Northwood Pulp and Timber Ltd., Upper Fraser Sawmills have agreed to eliminate the open chlorophenate dip tank and replace it with a closed chlorophenate spray chamber. The new system will conform to the recently

released guidelines for chlorophenate treatment systems.

Despite the fact that three pulpmills in Prince George have upgraded their emissons and correspondingly reduced total sulphur discharges to the air by approximately 80 percent during the last few years, the ambient air quality in Prince George has not shown any corresponding improvement. Further study is being planned to explore this phenomenon.

Thompson-Nicola Region

The Nicola Basin Operational Plan is being implemented and data gaps identified in the strategic plan are being filled.

The Village of Clinton is attempting to identify the most cost effective approach to sewage treatment and disposal which will negate or limit the effect of nutrient enrichment in Clinton Creek.

The Ministry and the Thompson-Nicola Regional District successfully accomplished a significant improvement in the operation of the six refuse sites within the Regional District.

The City of Merritt sewage treatment plant improvements are underway. The improvements will see removal of the treated sewage discharge from the Coldwater River during the low flow periods of the year.

Work is underway on the upgrading of the City of Kamloops sewage treatment facilities. Aeration, extending storage facilities, trial infiltration basins and some spray irrigation are the new features of the upgraded system.

A study of the Salmon River and White Creek was undertaken to assess the effects of the agricultural operations on Tappen Bay/Salmon Arm water quality of Shuswap Lake.

A study of Campbell Creek (east of Kamloops) was undertaken to assess the effects of agricultural operations on this stream.

This past year the Columbia Shuswap Regional District have cooperated with Regional staff in the establishment of sewage disposal areas at its refuse sites.

Cariboo Region

A report concerning the impact of existing and proposed development on fish spawning grounds in Kokanee Bay on Lac La Hache was completed and submitted to the Cariboo Regional District which had requested the study.

Work continues with the Dragon Lake Improvement District to improve the water quality of Dragon Lake.

A preliminary set of background water chemistry and sediment chemistry samples were obtained from the proposed log dumping site on Quesnel Lake to provide information for future reference from sites near Kokanee Shoal spawning areas.

Williams Lake bottom sediments are being studied to assist in the establishment of water quality objectives for the watershed.

Negotiations to finalize an agreement between Cariboo Pulp, Cariboo Regional District and the City of Quesnel for the treatment of Domestic Sewage in the pulp mill treatment system are ongoing.

The Quesnel River Pulp treatability study showed success in reducing resin acids to non-toxic levels. The study report should be completed by mid-summer 1984.

A technical burner committee with representatives from mills in the Williams Lake area was established to identify problems associated with burning of woodwaste and to improve air quality by better operation and maintenance of the burners.

Okanagan Region

Shortfalls exist in hazardous waste contingency planning, permit reviews and impact assessments. Diffuse sources of nutrient contamination addressed as an unresolved area still requires attention.

Municipal refuse disposal practices continue to receive high priority.

An overall increase in compliance among industrial and air waste management permit holders was recorded, particularly in the high-risk category. Compliance with permit requirements in forest industry operations also showed some improvement, due to stepped-up surveillance.

Kootenay Region

During the fiscal year 36 of the 105 permits determined to be in non-compliance were brought into compliance.

Environmental and waste discharge monitoring continued as a major activity in the Kootenay Region. Surveys were carried out on the wastewater discharge from Westar Timber Ltd. and the Columbia River near Castlegar during low flow conditions.

A major sampling program was carried out at Cominco Ltd. Trail Operations in which all sewers and the Columbia River were sampled continuously over a 72 hour period. The monitoring confirmed considerable improvement in metals discharge levels as compared to similar tests in 1981.

Investigation into the nutrient balance in Tie Lake was completed, intensive monitoring of the St. Mary River was carried out and the Cranbrook watershed was sampled as part of a water quality investigation.

Significant progress has been made in the area of environmental safety. Regional spill response capability has improved and contingency planning for major industrial operations is proceeding.

Skeena Region

The problem of smoldering fires at the Smithers/Telkwa landfill site was resolved by negotiating better operating procedures with the Regional District of Bulkley-Nechako.

The Town of Smithers completed construction of a new sewage treatment plant.

Garbage disposal sites for the communities of Palling, Ootsa Lake, Iskut and Francois Lake were dramatically upgraded.

The Town of Stewart rehabilitated their sewage treatment plant.

Waste Management staff and Equity Mines personnel successfully completed negotiations for an amendment to their effluent permit which authorized the establishment of a treated acid mine water storage pond and the discharge of treated acid mine water to the Foxy Creek basin.

A serious effluent problem was discovered at Ocelot Industries Ltd.'s mechanol plant at Kitimat. The Company implemented remedial measures which were successful in improving effluent quality and reducing toxicity.

Waste Management staff established a region-wide water quality monitoring network for subregional planning and project assessment purposes.

A new poly aromatic hydrocarbon (PAH) monitoring station was established in Kitimat to monitor the effect of emissions from the Alcan Smelter on local air quality.

Conservation Officer Service

The following Acts are enforced:
Waste Management Act
Environment Management Act
Litter Act

Conservation Officers spent a total of 2% of their operational time on the enforcement of Waste Management legislation.

Statistics 1983	1982 (increase/decrease)
280 complaints reported by public	+ 11%
171 violations found by conservation officers	- 12%
50 Court proceedings instituted	- 28%
33 convictions registered	+ 1%
134 warnings issued	+ 59%
70 cases unsolved	+ 57%
$20,385 fines levied	+169%

Pesticide Control Program

The goal of the Pesticide Control Program shall be to ensure that pesticides are sold and used safely to protect human health and to maintain environmental quality.

Objectives of the program are:

1. To maintain the prudent use of pesticides according to label directions and regulations.
2. To minimize the impact of pesticides on public health.
3. To minimize the impact of pesticides on environmental quality.
4. To improve public understanding of pesticide use in the province.

Legislation Administered

Pesticide Control Act

Pesticide Control

The Pesticide Control Program is responsible, under the Pesticide Control Act, for ensuring that useful, federally-registered pesticides are used safely in the province in a manner that will not produce an adverse effect to people or the environment.

Administration

Regulations to the Pesticide Control Act were amended to incorporate a system of allowing farmers to spray leased Crown land under permit-like conditions. An information package was initiated to advise farmers of these amendments.

Initial drafts were discussed for amending the classification system of pesticides.

Permits

A total of 360 permits for pesticide use were reviewed in 1983.

There were 241 permit site inspections made to examine the potential health concerns and potential environmental effects in pesticide use.

During the past year, there were appeals against 12 permits. No appeals were upheld by the Environmental Appeal Board, but the Board added or amended conditions to 5 permits.

Training and Certificates

The regional staff presented 80 adult pesticide training courses and issued 1,861 certificates. Of the certificates issued, 1,060 were issued to qualified applicators and 801 were issued to qualified dispensers.

The training and certification of agricultureal crop applicators was emphasized and certification of farmers applying pesticides increased from 173 during the 1982/83 fiscal year to 192 during the 1983/84 fiscal year.

The Ministry of Forests has gradually been given the opportunity of training pesticide applicators in the forest industry on behalf of the program.

Licenses

The four regional offices issued a total of 1,527 licenses (859 pesticide vendor licenses and 668 pest control service licenses).

Compliance

From the 2,102 inspections of the pesticide service and vendor premises, there were 10 licences suspended, 1 permit suspended, and a total of 17 charges were laid.

Staff were involved in investigating poisonings of birds, domestic dogs, sick cattle, forestry and farmworkers as well as contaminated drinking water and defoliated trees. In at least half the cases, the cause was not pesticides. Staff also investigated several instances of highly toxic compounds being stored or shipped in leaking containers.

A major investigation involved the apparent misuse of chlordane dust in several homes in the Lower Mainland. In one case, chlordane residue levels in air were significantly reduced to safe levels by extensive cleaning and sealing.

Technical Information and Publicity

The ministry continues to supply the public with free advice on the safe use of pesticides. A central library of all important pesticide references is being accumulated which will allow the Victoria office to act as a "nerve centre" for pesticides information in the province.

Weekly radio programs on pesticide safety and use were broadcast within all areas of the Okanagan region, primarily directed to the agricultural community.

Special Studies

Work has progressed in developing a computerized permit data file which summarizes applications for permits. This summary will improve staff capability to answer questions from the public and private sectors regarding the occurrence and impact of pesticides in the province.

Summary of Pesticide Control Program Activities by Regions 1983-1984

	Vancouver Island Region 1	Lower Mainland Region 2	Northern Region 5, 6 & 7	Central & Kootenay Region 3 4 & 8	GRAND TOTAL
1. LICENSING:					
Vendor Licenses Issued	136	378	105	240	859
Service Licenses Issued	107	322	90	149	668
2. TRAINING & CERTIFICATION:					
Pesticide Applicator & Dispenser Courses	21	36	14	99	80
Course Attendance	472	854	207	270	1803
Examinations Written (Courses & Home Study)	558	1083	275	435	2351
Certificates Issued	430	903	190	338	1861
Failures	38	170	115	103	426
3. PERMITS:					
Permit applications Reviewed	132	59	56	113	360
4. COMPLIANCE:					
Vendor & Applicator Inspections	289	1327	178	218	2012
Permit Inspections	72	61	12	96	241
Certificates Susp/Revoked	4	0	1	0	5
Licenses Susp/Revoked	4	4	1	1	10
Permits Susp/Revoked	0	0	0	1	1
Charges Laid	0	8	2	7	17
5. INVESTIGATIONS:					
Pesticide Accident/Misuse Investigations	22	57	9	85	173

Provincial Emergency Program

The role of the Provincial Emergency Program is to provide guidance, leadership, coordination and liaison with all levels of government, Ministries and Crown corporations, in order that resources are used to the greatest advantage in the event of an imminent or actual emergency or disaster; to mitigate the effects on the people, environment and property; to ensure continuity of governmenmt.

Objectives of the program are:

1. To protect life and minimize damage from environmental, man-made, and natural disasters by:
    a. Assuming responsiblisty for an appropriate level of psreparedness and emergency planning at the Provincial, Regional, and Local Government Level;
    b. Initiating and participating in emergency planning and arrangements with the Federal government, international jurisdictions, territorial governments, and other Provinces;
    c. Ensuring the provision of wrning systems, information programs and emergency reporting and response communications;
    d. Co-ordinating emergency response and maintenance of essential services during an emergency.
2. To protect life and minimize damage from incidents involving special wastes or dangerous goods by planning and co-ordinating effective Ministry regional and Headquarters response systems.
3. To oversee recovery from disasters by co-ordinating the provision of disaster relief and assistance measures.

Legislation Administered

Emergency Program Act
Environment Management Act
Municipal Act
War Measures Act
Emergency Supply Allocation Act

Provincial Emergency

The Provincial Emergency Program is responsible for the coordination of provincial emergency arrangements and integrated response plans. The Program also assists local governments, provincial ministries, boards and commissions, federal departments, the private sector and neighbouring juridsictions in areas of emergency preparedness.

General

The following initiatives were advanced during the reporting period:

- Federal/provincial negotiations on the delegation of emergency roles and responsibilities
- Response/recovery protocols on Indian Reserves
- Natural and man-made hazard warning systems
- Computerization of inventories and accounts
- Intergovernmental cost-sharing arrangements
- Contingency planning
- Statutory review
- Policy and procedure development.

An intragovernmental advisory group was convened to review and confirm emergency roles, responsibilities and arrangements at the provincial level.

Program Management Section

A three year plan for the employment of the Joint Emergency Planning Program (JEPP) federal provincial cost-sharing arrangement was developed for government consideration.

A major flood, during early January, in the southwest part of the province, resulted in the immediate provision of temporary assistance to victims to relieve them of the direct effects of this emergency. The program then coordinated the promulgation of an $8 million Order-in-Council under the Flood Relief Act for the purpose of providing recovery aid to eligible landowners, local governments, small businesses, farms and government departments.

An agreement was reached with Emergency Planning Canada and Agriculture Canada regarding the development of a joint operations plan for exotic livestock disease outbreaks.

A working agreement was reaffirmed with the Ministry of Forests concerning forest fire evacuation planning and coordination.

A new grant formula was developed to help local governments in their planning and coordination functions. This new funding level raises the amount of financial support by approximately 25% and is scheduled for application in 1985.

The program handled emergency reports as follows:

40 Air Searches
31 Ground Searches
170 Dangerous Goods incidents
13 Floods
39 Other Categories.

Training Section

The provincial college, located at program headquarters, offered or coordinated a total of 351 courses, exercises and conferences throughout the province, attracting 4,965 participants.

The training staff also coordinated provincial/local government nominations to federal courses offered at Arnprior, Ontario. A total of 162 candidates were selected for 67 courses.

Operations Section

Through six regional offices and staff support from headquarters, the program assisted local governments and other authorities in their emergency programing/planning functions, supported by a volunteer force of over 9,000 people. The program expended over $90,000 for these emergency operations.

Planning

A number of planning efforts were undertaken and continue to move the province towards a higher level of readiness. These planning areas included:

- Emergency preparedness plans for major hydro impoundments;
- Energy supply shortages;
- Tsunami warning;
- Mt. Baker eruption arrangements;
- Forest Fire evacuation;

- Flood contingencies;
- Emergency component plans for key sectors of an emergency response.

Major Events

A number of major events occurred including:

- May - Debris torrent in Tinhorn Creek watershed causing approximately $50,000 in damages to the facilities of the South Okanagan Lands Irrigation District.
- June - Flooding of Mill Creek in Kelowna.
- July - Flooding of Illecillewaet River, Mt. Revelstoke National Park resulting in the washout of the Trans-Canada Highway crossing and a 10 day closure.
  - Debris flows and runoff disrupts Highway #1 west of Hope as well as some secondary and access roads for approximately one week.
- September - Search and Rescue operation "Melissen", the largest air search ever mounted in Canada, involved 1339.2 hours of PEP volunteer time and 89 PEP aircraft from three regions of the Province. The object of the search was a light plane enroute to Smithers from Campbell River. A total of 2909.1 flying hours were logged through the federal search headquarters located in Smithers.
- October - An aircrash during an Air Service exercise resulted in two fatalities and two injuries.
- November - A rockfall off Bastion Mountain near Shuswap Lake destroyed an occupied home resulting in the death of two of the three occupants.
- December - Flooding near Gibsons and in Strachan Creek resulted in substantial damages to services, roads, land values, and residences.
- January - Rain and a warming trend resulted in widespread flooding throughout the Southwest portion of the Province. An $8 million Order-in-Council was raised to give aid to flood victims.
- March - the vandalism of storage tanks at the Cloverdale paint facilities resulted in the release of 45,500 litres of pentachorophenols into a local watershed.

Oil and Dangerous Goods

The following amounts of dangerous goods were spilled during the 1983/84 fiscal year. A total of 574 incidents were reported.

Petroleum products	9,024,672 litres
Chemicals (Volume)	1,876,589 litres
(Weight)	583,113 kg.

The Program expended approximately $217,119 in response to these spills.

Search and Rescue

With the creation of the Canadian Marine Rescue Auxiliary (CMRA) under the auspices of the Canadian Coast Guard, the program has supported the transition of our marine rescue volunteers into this new organization.

The Program maintained an active Air Service for most of the reporting period. Interpretations placed on federal cost-sharing, during the last month of the fiscal period, resulted in the unavoidable cancellation of all Air Service operational and training tasks. This stand-down continued beyond the fiscal year end.

The program purchased an appreciable amount of cliff rescue equipment during the fiscal period for distribution to land search and rescue groups with a demonstrated need for such equipment.

Special provisions were also made for volunteer tracking dog handlers who wish to augment RCM Police capabilities.

Communications

Under JEPP, the federal-provincial cost-sharing program, the Province purchased and distributed approximately $200,000 worth of communications equipment.

The PEP amateur radio operators continued to provide a vital alternative to land-line communications.

Emergency Tasks 1983-1984

EMERGENCY TASKS	REGION 1	2	3	4	5	6	7	8	TOTALS
Air	4	5	2	8	3	4	14	2	42
Land	66	85	21	29	18	18	18	29	284
Marine	209	81	7	1	1	72	2	10	383
MVA *	10	16	3	2	21	-	52	8	112
Flood	1	13	2	2	-	-	-	7	25
Fires	3	4	-	-	2	2	2	-	13
ODG *	28	13	4	6	2	2	6	14	75
Patrol	2	2	3	-	-	-	-	2	9
Miscellaneous	8	8	4	1	4	1	3	2	31
TOTAL	331	227	46	49	51	99	97	74	974

* MVA: Motor Vehicle Accident

ODG: Oil and Dangerous Goods

Surveys and Resource Mapping Program

Goals and objectives of the Surveys and Resource Mapping Program include:

- The establishment and maintenance of standards and procedures for Provincial mapping, air photography/remote sensing, survey control, and biophysical thematic data collection and mapping.

- To develop and maintain an efficient Provincial base mapping system and to produce maps as required by Government agencies and the general public.

- To develop and maintain an efficient biophysical thematic mapping system to meet the management requirements of Government agencies.

- Also respond efficiently to requests from resource management agencies for specific, project-related requirements for remote sensing, mapping, and data interpretation.

Legislation Administered

Municipal Act
Boundary Act
Ministry of Environment Act
Environment Management Act
Official Surveys Act - Federal

Surveys and Resource Mapping

General

Significant reductions in auxiliary and regular staff were balanced by program remodelling to satisfy stringent fiscal and budgetary policies.

Efforts to improve cost-recovery were reflected through January price increases for maps and photos and in broadening the range of chargebacks for products and services provided to other ministries and non-government users.

MAPS-B.C. continued to supply products and services. There were 35,617 phone, mail, and counter requests for service, an average of 137 a day. Efforts were initiated to expand the number of private map and photo vendors and the variety of products and services offered.

Mapping Section

Base Mapping

Base maps in digitized and non-digitized modes continued to be produced for the Ministries of Environment; Forests; Lands, Parks and Housing; Energy, Mines and Petroleum Resources, and Municipal Affairs. The B.C. Assessment Authority remained a major outside client. Negotiations through the Mapping Program Steering Committee produced an extended three-year (1984-87) large-and-medium scale base mapping agreement. This is the first time that mapping has been planned and dedicated beyond a single year. A ten-year rolling program is being developed.

The Digital Mapping Unit processed 328 new 1:20 000 scale maps and 416 20-chain conversions, segmented into a total of 1,488 individual layers of planimetric, cadastral, and topographic data. At 1:5 000 scale, 28 sheets were digitized for planimetry and 41 for cadastral detail. An additional 24 sheets were digitized at 1:10 000.

The Photogrammetric Unit turned out 206 planimetric bases and 162 contour layers at 1:20 000 scale and 107 planimetric bases and 64 contour layers at 1:5 000. 17 orthophoto maps were produced at 1:5 000.

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Reprographics

This unit produced 218,083 contact size air photo prints, 4,637 enlargements, 6,464 colour air photo prints, and 7,506 diapositives. Other services included production of whiteprints and camera- and contact-negatives and positives and 105 mm negatives and blow-backs. Revenues exceeded material costs by approximately $200,000.

Special Projects

Ten special projects were completed. Four special projects were managed under contract. The rest were completed by branch resources.

By the end of the year, this sub-program had been phased into regular series base mapping. Clients continuing to have special mapping needs outside of regular series production will be dealt with under a chargeback system.

Derived (Lithographic) Mapping

Production of new and revised lithographic maps was terminated at year's end.

Eleven new or revised editions of 1:100 000 scale maps were issued. These were 93C/NE (Itcha Range); 93C/NW (Ilgatchuz Range); 93C/SE (Chilanko River); 93C/SW (Atnarko River); 93F/SE (Euchiniko Lakes); 93F/SW (Entiako River); 93H/SE (McBride); 93J/SE (Salmon River); 93J/SW (Great Beaver Lake); 83E/SW (Mount Robson), and 92H/SW (Chilliwack Lake). A third edition of the popular WCT-2 West Coast Trail map was produced, along with a new park sheet PSWG-3 (Wells Gray Provincial Park).

Survey Section

A maintenance-fabrication centre completed 365 projects for the Branch and Ministry.

Control for 10 base mapping projects was done by in-house resources, while 13 projects were handled by contractors. A total of 210 horizontal control points, 548 cadastral ties, and 207 photo control points

were coordinated under contract. Accomplishments under Branch resources were 109, 253, and 121 respectively. One integrated survey project (Matsqui) was worked on by contractors and 5 by in-house staff. The Survey Computations Unit, which makes final computations and adjustment of field survey data for integration into the Provincial network, handled 38 computation and adjustment projects covering 1,048 integrated survey monuments, 319 horizontal control points, 40 benchmarks, 328 photo control points, and 801 cadastral ties. Computations were also made on 1,106 wellsite locations for the benefit of the petroleum and natural gas industry.

Contracts

Approximately 20 percent of the $1,100,000 contract budget was spent on control surveys for medium scale in-house base mapping. 10 percent was assigned to integrated surveys. Nine aerial photography contracts were issued. A joint B.C.-Alberta high altitude photo program was a casualty of restraint at the planning stage. It was a poor year for photography, only 16,000 of the requested 30,000 line km were obtained. The shortfall was partly salvaged by a winter flying program during which more than 5,000 line km of 9,000 requested were acquired. It is significant that of the $240,000 spent on aerial photography all but $15,000 was for other ministries for thematic interpretation.

Production of base maps under contract yielded 176 large scale topographic and 332 cadastral sheets.

The Data Bank Unit loaded the entire Base Mapping Directory onto the IBM mainframe at B.C. Systems Corporation. Given appropriate identification, users can now interrogate and read the directory using the WYLBUR terminal.

Computer Aided Planning, Assessment and Map Production (CAPAMP)

Computer mapping was concentrated on refining system operation methods. A variety of automated interpretative maps and reports were produced, including soil management groups for agriculture, soil sensitivity to acidification, surface soil erosion potential, and soil limitations for solid waste disposal sites. Soils information was entered to CAPAMP for the Lower Fraser Valley and Sunshine Coast, and the Duncan-Nanaimo area on Vancouver Island.

Soils Unit

Work completed included:

1. Soil maps at 1:50 000 scale for the Ashnola Habitat Study;
2. Irrigation requirement soil erosion and soil drainage maps and data prepared for the Fraser-Delta Strategic Planning Unit;
3. Field mapping at 1:20 000 in the Parksville-Qualicum area for fine tuning the agricultural land reserve for the Ministry of Agricultural and Food and Agricultural Land Commission. Work continues on the report for the Duncan-Nanaimo area.

During the year about 200 plot records were added to the Vegetation Data Bank and over 1,300 site records were incorporated into BCSIS.

Terrain Analysis

Terrain work focussed on physical interpretation and related applications. The Terrain projects included:

1. Completing 1:50 000 terrain maps for the Deep Basin and Carbon Creek areas of Northeastern B.C., and another 4 terrain maps in the Morice Lake area, as part of the biophysical projects;
2. Completion of 4 1:250 000 surficial materials maps for the Skeena-Nassu Strategic Planning Unit, and the Stikine-Iskut area for B.C. Hydro;
3. Completion of 1:250 000 geophysical shore-zone terrain and slope stability map for Gambier and Anvil Islands for the Ministry of Forests. Development of the shore-zone classification system continued;
4. Other work included geological contribution to a study of archaeological sites for the Provincial Museum, and a book for a field trip of Southern Vancouver Island for the 1983 Annual Meeting of the Geological Association of Canada.

Vegetation Unit

This Unit provided base information primarily for wildlife habitat classification and for vegetation criteria for monitoring air quality. During the year reports were prepared on 6 Biophysical Wildlife Habitat Capability projects (East Kootenay, Northeast Coal, Purcell, Dewdrop, Maxam Lake, and Timothy Mountain Succession Study). Strategic Planning Inputs were completed for Thompson-Bonaparte, Peace River, Fraser-Delta, and Stikine-Iskut planning areas. Air quality criteria documents were completed for SO_2, NO_2, and O_3. A lichenometric study of air quality has been completed.

Wildlife Habitat Unit

This unit completed management working reports for moose habitat of the Bulkley-Endako area; Elk Habitat in the Salmon River Valley; the Cowichan Estuary; Effects of Gravel Removal on the Delkatla Sanctuary; and a Log Handling Plan for the Kumdis Slough. Mapping was completed on 9 biophysical ungulate capability maps at 1:50 000, for 3 similar maps at 1:250 000 for the Skeena-Nass Strategic Plan, and 3 estuaries at 1:5 000. A problem analysis for a joint Ministry of Forests and Environment Wildlife-Forestry Management Handbook and a draft report for Wildlife Ecosystems of B.C. (formerly Biotic Regions) were finalized.

Environmental Quality

Environmental quality work has continued in ongoing projects with the Waste, Air, and Water Management Programs:

1. In Special Waste Management, technical input was provided in the preparation of Special Waste Regulations and for public information for identifying potential secure landfill areas. Both were presented at public meetings and open houses.
2. For evaluating potential landfill sites for refuse in the Lower Mainland, soils and surficial geology information was prepared and specific sites were field inspected and rated for suitability.
3. For identifying "Soil Constraints for Septic Tank Effluent", a manual has been produced to assess soils for analysis of water quality impacts and for Public Health Engineering work.
4. On "Soils and Geological Sensitivity to Acid Rain", Terrestrial Studies staff participated with the Western Canadian representatives to prepare a report defining mapping criteria. A B.C. map of acid rain sensitivity is in preparation.
5. In cooperation with the Water Management Branch, existing groundwater quality data has been reviewed and computer plotted.

Soil Laboratory

The Soil Laboratory completed a total of 34,529 analyses during the year compared with 37,260 in the previous year. The analyses support soil and terrain interpretations for Ministry of Environment Programs (33% of the analyses), Ministry of Agriculture and Food (42%), and Ministry of Forests (21%). This represents a cutback of samples sent by Ministry of Forests.

There were some modifications of laboratory procedures. By using dilutol and proportion techniques, the laboratory was able to determine the phosphorous, boron, sulfur at a faster rate. Sulfate-sulfur was determined by the new modified method instead of Johnson-Nishita method. This laboratory was able to use ascorbic acid as a suppressor for interferring ions in the total soil digest for total sulfur analysis. Batch handling techniques were also introduced, so that samples can be extracted, filtered, etc., at a batch of 10 samples each time. In this way considerable time is being saved.

Environmental Appeal Board

Thirty-three (33) licences, permits or orders of the Director of the Waste Management Branch, the Director of the Fish & Wildlife Branch, the Comptroller of Water Rights and the Administrator of the Pesticide Control Act were appealed in 1984 to the Environmental Appeal Board. These appeals resulted in twenty-six (26) hearings. There were forty-three appellants, some of whom appealed the same licence, permit or order. A number of the appellants represented group organizations, but as far as the Board could estimate from the information presented to the Board at the hearings, the appellants would not appear to represent more than one thousand (1,000) people in the Province.

Of the appellants, ten (10) won their appeal, twenty-five (25) lost and six (6) abandoned their appeals before the hearing was convened or failed to show up at the hearing. Two of the appellants' appeals were left undecided, so the hearing was adjourned "Sine Die".

Two of the Board's decisions have been appealed to the Supreme Court of British Columbia for a judicial review. On one of the cases, the Supreme Court has upheld the Board's decision, and on the other case, the Board understands that it will be ordered to rehear the appeal, with some instruction from the Supreme Court judge. Further, the Board has also been made aware that the first case mentioned above will now be appealed to the next highest court in the Province, the Appeal Court of British Columbia.

A breakdown of the results of the appeals, in relationship to the four Branches of the Ministry, is as follows:

1) Waste Management:

Number of Appeals	-	6
Appeals Upheld	-	1
Appeals Denied	-	3
Appeals Abandoned	-	1
Appeals Pending	-	1
Judicial Review	-	1

2) Water Management:

Number of Appeals	-	5
Appeals Upheld	-	1
Appeals Denied	-	2
Appeals Abandoned	-	1
Adjourned "Sine Die"	-	1
Judicial Review	-	1

3) Fish & Wildlife:

Number of Appeals	-	8
Appeals Upheld	-	2
Appeals Denied	-	4
Appeals Abandoned	-	1
Appeals Pending	-	1

4) Pesticide Control:

Number of Appeals	-	14
Appeals Upheld	-	2
Appeals Denied	-	10
Appeals Abandoned	-	2

In connection with the complement of the Board and the activity of its members, the following information is reported.

Members of the Board. (Total 21)

Frank Hillier	P.D. Meyers
Lloyd Campbell	J.O. Moore
Dr. Wm. Godolphin	Dr. Brenda Morrision
I.A. Hayward	Lou Osipov
H.D.C. Hunter	Dr. R.F. Patterson
Duncan Heddle	John Potter
Graham Kenyon	G.E. Simmons
Dianne Kerr	W.N. Venables
G.R. Knight	Wm. Vogel
A.J. Lynch	James W. Warr
	Dr. C.C. Walden

Services

General Administration

Information Services

Financial Services

Personnel Services

Planning and Assessment

Environmental Laboratory

Conservation Officer Service

General Administration

The General Administration Program is responsible for the support of the ministry operations through the provision of executive direction, coordination, information, personnel, finance, systems, space, laboratory, enforcement, planning, assessment, communications, and general administrative services.

Information Services

The government's decision to centralize the information function of all ministries seriously impacted the communications program of the Ministry of Environment.

The authority and financial responsibility for the production of all advertising and publications was transferred to Government Information Services. This resulted in major staff reductions and in the ability of the ministry to respond to information demands. The ministry's flagship publication "Wildlife Review" was sold to a private publisher. The popular ministry newsletter "Environment News" was discontinued and information offices in Prince George and Surrey were terminated.

The delivery of the Conservation Outdoor Recreation and Education Program (CORE) was transferred to the Open Learning Institute and the B.C. Federation of Shooting Sports. The ministry retained responsibility for enforcement of the legislation requiring all first-time hunters to successfully complete this course of instruction.

A major communication program associated with handling of 'Special Wastes in B.C. produced a series of fact sheets, news releases, media events and a number of public meetings.

Ministerial Environmental awards, in two categories with three sections, were awarded to industry, public interest groups and individuals in recognition of their contributions to protect the environment of the province.

More than 80 news features were released.

The ministerial shopping centre display featured the province's special waste program and the wildlife art of Jack Grundle in support of the Habitat Conservation Fund.

Environmental Education

Efforts in the field of environmental education featured the development of curriculum material for the Ministry of Education; the production of a television program for the Knowledge Network and for the Cablevision Network. Contributions to education included identifying environmental needs, clarifying objectives and reviewing curriculum developed by the Ministry of Education for Science and Consumer Education courses.

Library

Library use continues to increase; inter-library loans having tripled to 4,200. There were 3600 new acquisitions and 3000 reference inquiries.

Financial Services

Financial Services provides accounting services for the Ministry including direction and assistance in the preparation of annual estimates, budgetary control, preparation and distribution of payroll data, processing of accounts payable, billing and collection of revenue.

A highlight of the year was the introduction of the electronic Budgetary Accounting System to meet the Ministry's accounting and financial management information needs. Computer terminals have been installed in all major Ministry cost centres and provide for on-line entry of commitments and on-line inquiry capabilities which will give up-to-date information on expenditures and funds available.

Ministry revenues and recoveries for fiscal 83/84 totalled $192,124,658 which is a decrease of $13,635,705 from fiscal 82/83 and can be attributed to a reduction in water rentals. Ministry expenditures for fiscal 83/84, including those of the Habitat Conservation Fund, totalled $80,981,257 which is a decrease of $3,003,535 from fiscal 82/83.

Personnel Services

Personnel Services provides services to the Ministry in the fields

of recruitment and selection, salary administration, job and organizational analysis, contract administration, collective bargaining, employee relations, staff development, safety, and records administration.

The Ministry was involved in its second major strike in November 1983.

Recruitment and selection were virtually non-existent during the year. Spending cuts reduced operational expenses to a minimum. The biggest impact of restraint, was the downsizing operations which decreased the Ministry's employment level by over thirty per cent.

Several branch reorganizations were initiated during the year, in part as a result of the fine tuning that followed the major Ministry reorganization which commenced in 1980 and as a result of restraint. This activity continued to produce a high volume of job analysis work during the year.

A scheduled selection audit conducted by the Public Service Commission in our Kamloops office resulted in a commendable rating of our regional office.

Staff Development & Safety

In staff development, management training in labour relations, financial management and project management were provided in-house to build our management capability. A greater volume of technical training was conducted using in-house experts who were trained to be trainers. Examples of programs provided were stack sampling, pesticide control, wind tower erection and dispersion modeling. A significant improvement in the volume of training for administrative support staff was made this year in response to expressed concerns of the previous year.

In safety, all video display terminals in the Ministry were tested. This Ministry was the first to recognize the importance of VDT worksite environments to worker productivity.

A major program was initiated to reduce vehicle accident costs by providing defensive driving training to employees required to drive in their work.

Considered the most innovative program of its kind in Canada, our diving operations established a new standard for safety in the province.

Comprehensive safety audits of regional operations yielded new insights into improvements required in our safety program. Immediate action has been taken to correct deficiencies. Safety training programs were designed and delivered in such diverse areas as bucking and falling, wilderness survival, first aid, firearm safety, offshore boating and hazardous chemical handling.

Central Services

The function of Central Services is to meet the accommodation requirements of the Ministry, administer the Ministry vehicle fleet including purchasing and insurance, to provide other support services including mailroom/courier, parking, security, furnishings, photocopiers, warehousing, insurance and telecommunications.

Planning and Assessment

Planning and Assessment assist in the coordination of program activities across the Ministry and thus develop Ministry-wide analyses of environmental issues. Objectives are to:

- prepare plans that provide coordinated direction for future resource managment
- prepare Ministry assessments of major project proposals and recommend measures for managing environmental impacts
- undertake economic and social analysis for individual Ministry Programs.

Planning activities assisted various programs in long-term resource analysis, notably in preparing regional plans for fishery and wildlife management, and assessessing the opportunities for the development of marine resources.

A significant activity was the preparation of sub-regional strategic plans. These plans integrate all activities of Ministry Programs with the purpose of enabling the Ministry to set out clear quantified management objectives for the environmental resources under its mandate. These

plans in turn give direction for the Regions to prepare operational plans for inputs to Ministry budgets.

Two plans - Peace and Finlay-Omineca - were completed and submitted to senior Ministry staff for approval. Five other plans - Similkameen, Elk-Flathead, Upper-Columbia, Fraser-Delta and Thompson-Bonaparte - had either been written or were in the final stages of preparation by the year-end.

Planning activities also include the preparation of Ministry submissions to twenty-seven Official Settlement Plans being prepared by Regional Districts: the preparation of Ministry submissions to the 5-year Forest and Range Analysis of the Ministry of Forests; and representation of the Ministry on the interagency Northwest Development Study, coordinated by the Ministry of Industry and Small Business Development.

Project Assessment

The staff represents the Ministry on the Provincial Coal Guidelines Steering Committee and Metal Mines Steering Committee in the review of proposed coal and metal mine development under established provincial guidelines. During the year projects which were ultimately given approval-in-principle by the Environment and Land Use Committee, were the Quinsam Coal Project and the Sage Creek Coal Project. The former was the subject of the first public inquiry under the Environment Management Act. Staff played significant role in coordinating the Ministry submission to the inquiry and providing assistance to the Commissioners. Other projects included Wolfe Mtn., Blackdome, Harrison Lake Gold, expansions of Fording Coal, Westar and Byron Creek Collieries, Carbon Creek, Telkwa, Kutcho Creek and Mt. Klappan.

Energy Projects

During the year, staff coordinated Ministry analysis of the proposed natural gas pipeline proposals from the Mainland to Vancouver Island and on the Island, submitted evidence to the BCUC Hearing Panel on the B.C. Hydro route proposal at Roberts Bank.

Also, a number of energy developments reviewed included the proposed L.N.G. plant at Port Simpson north of Prince Rupert, Alcan's Kemano completion hydro project and associated smelter at Vanderhoof, the Murphy Creek- Keenleyside hydro power project proposed by B.C. Hydro and the Stikine-Iskut power project. Staff completed a preliminary environmental assessment of the proposal to resume exploration for oil and gas in offshore waters and assisted in drafting the terms of reference for the public inquiry to be held under the Environment Management Act and the federal government's environmental assessment process.

Over the year, staff developed improved methods for managing impacts during project construction and operation in close association with the regional offices and developers.

The staff participated in the development of the Fraser, Cowichan and Squamish estuary management plans through the provision of resource planning assistance. Staff assumed the lead role in coordinating the implementation of the recommendations of the Cowichan Estuary Task Force Report, developed consensus with industry and the Federal Department of Fisheries and Oceans on the contentious issue of log storage and drafting an Environmental Management Plan for the Estuary.

Staff serves as provincial representative on major proposal reviews initiated by the Federal government. Such as the Roberts Bank Port Expansion, Canadian National Railway Twin Tracking, Vancouver International Airport Expansion and the Port of Vancouver Master Plan.

Socio-Economic Analysis

Economic analysis of hunting and angling surveys of residents and non-residents were completed. Also an analysis of non-consumptive use of wildlife (i.e. non-hunting); a review of the economics and pricing of digital maps produced by the Ministry; the demand for shellfish in British Columbia; an assessment of the contribution that environment-dependent activities can make to the Provincial economy.

Environmental Laboratory

The Environmental Laboratory continued to provide chemical, biological and special services for the analysis of environmental samples to the Ministries of Environment, Forests, Agriculture and Health. It also provided services to crown corporations such as B.C. Hydro and some municipalities. During the reporting period 193,703 routine tests were performed for a total of 1,802,672 work load units. In addition, special projects were undertaken. The Laboratory also carried out analyses for 84 legals of which 13 resulted in court appearances. Under the program jointly managed by Environment and Health 860 public water samples were analyzed.

The Operations Section continued to provide analytical services for testing of water, waste water, ambient air, sediments and biological materials for inorganic and organic constituents and pesticide residues. During the 1983/84 fiscal year the Operations Section performed 180,729 routine water-related tests equivalent to 1,288,023 workload units and 9,655 air-related tests equivalent to 210,232 workload units. The rush analysis service, introduced last fiscal year, continued to provide priority service for samples designated as rush; 837 samples were analyzed.

Conservation Officer Service

The objectives of the Conservation Officer Service are to ensure compliance with ministry legislation by:

1. providing a prevention program through public education and involvement;
2. providing an environmental surveillance and protection program;
3. providing a patrol and investigative capability in order to apprehend violators, deter would be violators and to institute proceedings for prosecution under legislation for which this ministry has responsibility;
4. providing for the protection of the public and property from problem wildlife.

General

The Conservation Officer Service consisted of 91 field officers, eight senior conservation officers, eight regional conservation officers and five Victoria headquarters staff.

It is interesting to note that, while the abilities of conservation officers to get out in the field to detect and uncover violations has risen significantly over the past two years, the public's participation in notifying us of violations has dropped by 14%. This may indicate public complacency.

Operational capabilities continue to increase. The move to zone offices and the administrative and operational efficiencies incorporated into the Service over the past years may alleviate the impact of restraint.

Statistics 1983(Total)	1982 (increase/decrease)
3,231 violations reported by public	- 14%
5,374 violations found by conservation officers	+ 29%
2,896 Court proceedings instituted	+ 28%
1,950 convictions registered (69% rate)	+ 26%
2,789 warnings issued	+ 29%
1,081 cases unsolved	- 19%
$217,332 fines levied	+ 28%

The Conservation Officer Service is involved in the Ministry's major programs.

Conservation officers, in the course of their duties, lay charges under various other Acts, including the Criminal Code. In the year 1983/84, 16 charges were laid under other Acts resulting in 10 convictions, with a total of $1,505.00 in fines being levied.

Prevention

Conservation officers spent a total of 5,529 man-hours on community information and education related activities, representing 3.7% of their time.

Training

During the year, two basic firearms training courses were conducted in order to train a number of conservation officers in the policies, procedures and practices concerning the carrying of firearms. Training was also provided for 16 conservation officers in how to effectively deal with hostile individuals. This was found to be a worthwhile experience and will eventually be given to all conservation officers.

Additionally, conservation officers attended courses such as police investigators, supervisory, instructors and field trainers, sponsored by the Justice Institute and the R.C.M.P. Academy in Vancouver. Training amounted to 2,992 hours, or 2% of their time.

A training and development program incorporated the training of conservation officers in a formalized structure through each level in the Conservation Officer Service. A Field Orientation Manual was also developed for use during the probation period with new officers.

Legislation

Wildlife Act
Firearm Act
Migratory Birds Convention Act
Game Export Act
Federal Fisheries Act
Fisheries Act (Provincial)
Waste Management Act
Environment Management Act
Litter Act
Water Act